Appendix W Updates & Implementation

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Presentation Overview

- Proposed Revisions to EPA's Guideline on Air Quality Models
- Draft SILs Guidance
- Draft Modeled Emission Rate for Precursors (MERP) Guidance

Proposed Rule to Revise to the Guideline on Air Quality Models (Appendix W to 40 CFR Part 51)



Background

- EPA's Guideline on Air Quality Models (Guideline) is published as Appendix W to 40 CFR Part 51.
- EPA developed the Guideline to help EPA, States, and industry prepare and review new source permits and State or Tribal Implementation Plan revisions.
- The Guideline is important because it specifies models for regulatory application and provides guidance for their use.
- The Guideline provides a common basis for estimating the air quality concentrations of criteria pollutants used in assessing control strategies and developing emissions limits.



Proposed Revisions to Appendix W

- On July 14, 2015, the EPA proposed to update to the Guideline on Air Quality Models.
 - Published in the Federal Register (80 FR 45340) on July 29, 2015
 - Docket ID No. EPA-HQ-OAR-2015-0310
 - 90-day public comment period ended in Oct 2015 with 99 comments received from industrial stakeholders, federal/state/local government and tribal agencies, environmental groups, among others
- 11th Conference on Air Quality Modeling
 - August 12 and 13, 2015 at the EPA RTP, NC Campus
 - Conference focused on the proposed revisions to the Guideline
 - Served as public hearing for NPRM as part of public comment period
 - Transcripts and presentations posted to Docket and on the 11th Conference on Air Quality Modeling informational website http://www3.epa.gov/ttn/scram/11thmodconf.htm



Final Revisions to Appendix W: Schedule

- In the Spring of 2016, the Guideline final rulemaking was determined to be significant requiring OMB review.
 - The rulemaking package was submitted to OMB on August 30, 2016 with an anticipated 45 to 60 days review period.
 - OMB cleared the FRM on 11/30, the final rule is expected be signed within 7-10 days after clearance.
- The final revisions to Appendix W will become effective 30 days after Administrator signature and will include a transition period as described in the preamble to the rule.
- EPA will provide outreach to stakeholders through webinars on the final revisions to the *Guideline* that allows Q&A in addition to communications through EPA and external meetings, etc



Appendix W: Main Proposed Actions

- Science improvements to AERMOD Modeling System
 - Options to improve model performance under extremely light winds
 - Enhanced treatment of horizontal and capped stacks
 - Addition of a buoyant line source option
 - Updates to the NO2 screening techniques (ARM and PVMRM)
 - AERSCREEN as the recommended screening model for single sources
- Proposed Long Range Transport screening approach
- Single-Source Impacts on Ozone and Secondary PM_{2.5}
- Removal of BLP, CALINE, and CALPUFF as preferred models
- Allow prognostic met data in dispersion modeling for PSD



Role of the EPA's Model Clearinghouse

- The role of the EPA's Model Clearinghouse (MCH) further refined and clarified.
- The Administrators responsibility for approving alternative models is delegated to the Regional Offices via Appendix W.
- However, any alternative model approvals will happen with coordination, collaboration, and concurrence with Headquarters through the MCH.
- Updated MCH Operational Plan to be provided at final Appendix W signature.



Updates to Modeling Procedures

- Revised Sections 8 and 9 of Appendix W... previously Sections 8, 9, and 10... and some of Sections 6 and 7.
- Modeling domain and receptor placement more clearly defined.
- Revised emissions input requirements for nearby sources (Tables 8-1 and 8-2).
- Per cumulative analyses, more clarity on understanding background, nearby sources, and other sources that need to be explicitly modeled.
- Compliance demonstration procedures clarified in terms of source impact and cumulative impact analyses.



Single-Source Impacts on Ozone and Secondary PM_{2.5}

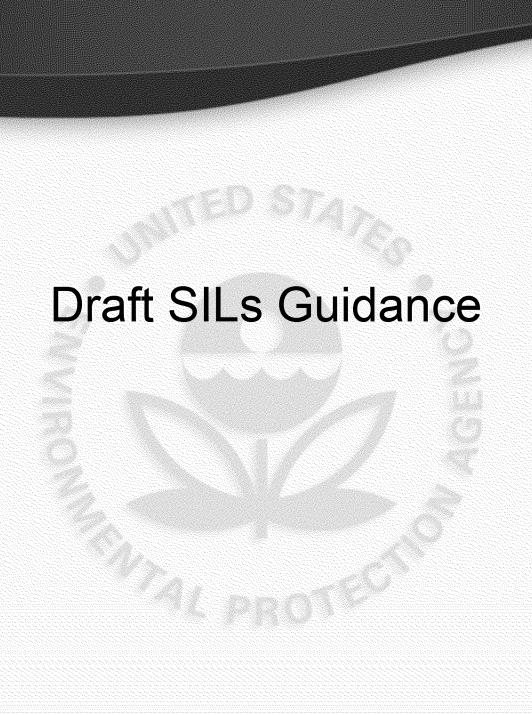
- The EPA believes photochemical grid models are most appropriate for addressing ozone and secondary PM_{2.5}
 - Provide a spatially and temporally dynamic realistic chemical and physical environment for plume growth and chemical transformation.
- Lagrangian models applied with a realistic 3-dimensional field of chemical species could be used for single source assessments.
- The EPA proposed a two-tiered demonstration approach for addressing single-source impacts on ozone and secondary PM_{2.5}.
 - Tier 1 demonstrations would use existing information relating emissions and air quality impacts.
 - Tier 2 demonstrations would be case-specific.
 - Draft Modeled Emission Rate for Precursors (MERP) guidance for Tier 1 demonstrations and single-source modeling guidance w/ NPRM for Tier 2 demos available.



Future Dispersion Modeling Work

- Continue to improve science in AERMOD, specifically research coordination with ORD and stakeholders on
 - Downwash algorithms (incl. source characterization issues)
 - Mobile source modeling (RLINE)
 - Evaluation of Offshore & Coastal Dispersion Model (OCD)
 - Instrumented modeling techniques for photochemical models (secondary pollutants)
- Improved technical coordination via IWAQM sub-teams
 - Transportation planning (w/ OTAQ) to better coordinate with FHWA, FTA, and FAA
 - Over-water modeling to better coordinate with BOEM
- Further engagement with the stakeholder community leading up to the 12th Conference on Air Quality Models in 2018.

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SILs Guidance Memorandum

 The memorandum and supporting documents were posted for informal public review on August 1, 2016.

https://www.epa.gov/nsr/forms/significant-impact-levels-ozone-and-fine-particles-prevention-significant-deterioration

- Consisting of...
 - A guidance memorandum that describes how these values may be used in a PSD compliance demonstration
 - A technical basis document describing how EPA developed the SIL values for PM2.5 and ozone; and
 - A legal support document that discusses a legal basis that permitting authorities may choose to apply if allowing sources to use SILs
- 60 days informal review and comment through September 30, 2016.
- The guidance is not a final agency action and is not binding for industry, permitting authorities, or the public.
- The guidance memorandum, technical basis and legal support documents are intended to be included in any permit record where the recommended SILs are used.

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Recommended SIL Values

Criteria pollutant	Recommended NAAQS SIL
(NAAQS level)	concentration
Ozone 8-hour (70 ppb)	1.0 ppb
PM _{2.5} 24-hour (35 μg/m ³)	1.2 μg/m³
PM _{2.5} annual (12 μ g/m ³ or 15 μ g/m ³)	* 0.2 μg/m³

PM_{2.5} Annual PSD increments, increment SILs

PM_{2.5} 24-hr PSD increments, increment SILs

		Concentr		Concentrations, µg/m³		
Increments	Class I 1		Class III 8	Class I 2		Class III 18
PSD increment SILs	0.05	0.2	0.2	0.27	1.2	1.2

^{*}The permitting authority has discretion to interpret an annual impact between $0.2 \mu g/m^3$ and $0.3 \mu g/m^3$ as significant.

Model Emissions Rate for Precursors: O3 and Secondary PM_{2.5}



Model Emissions Rate for Precursors: O3 and Secondary PM_{2.5}

- EPA has provided technical guidance that will provide a framework for development of Tier 1 demonstration tools under Appendix W for PSD permitting.
 - A Modeled Emission Rate for Precursors (MERP) is a type of Tier 1 demonstration tool that would represent a level of increased precursor emissions that is not expected to contribute significantly to levels of ozone or PM_{2.5}.
 - Guidance will provide a framework on how to arrive at values for MERPs based on existing relevant modeling or newly developed area specific modeling that source/states can utilize in their PSD compliance demonstrations. The guidance would not endorse a specific MERP value for each precursor.
 - Draft guidance was released on 12/2/16 for public comment, prior to App W FRM signature.

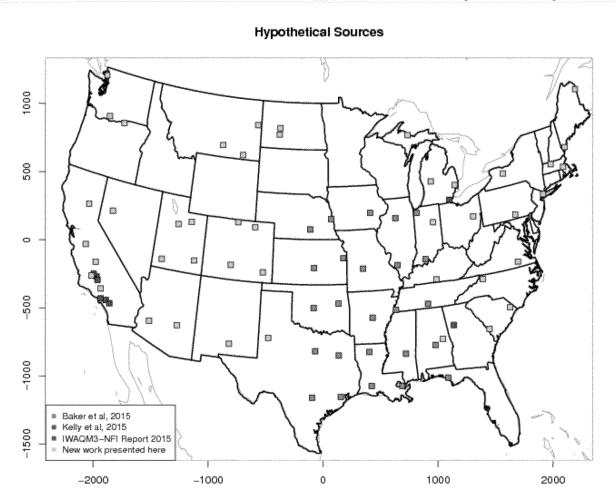


MERPs Guidance (cont)

- Provides a detailed framework that permit applicants may choose to use, in consultation with the appropriate permitting authority, to estimate single source impacts on secondary pollutants under the first tier (or Tier 1) approach.
- Presents the EPA's modeling of hypothetical single source impacts on ozone and secondary PM_{2.5} to illustrate how this framework can be implemented by stakeholders.
- Based on EPA modeling to inform illustrative MERPs, these values will vary across the nation reflecting different sensitivities of an area's air quality level to precursor emissions, thereby providing an appropriate basis for evaluating the impacts of these precursors to PM_{2.5} and ozone formation because they reflect the regional or local atmospheric conditions for particular situations.



MERPs Guidance (cont)



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Definition of MERP value

 To derive a MERP value, the model predicted relationship between precursor emissions from hypothetical sources and their downwind maximum impacts can be combined with a critical air quality threshold using the following equation:

MERP = Critical Air Quality Threshold * (Modeled emission rate from hypothetical source / Modeled air quality impact from hypothetical source)



Developing Area Specific MERPs

- 1) Define the geographic area(s)
- 2) Conduct a series of source sensitivity simulations to develop a database of modeled PM_{2.5} impacts associated with emissions of PM_{2.5} precursors (e.g., SO₂ and NO_X) from typical industrial point sources within the area of interest.
- Extract the highest modeled impact anywhere in the domain from the model simulation.
- 4) Calculate the MERP estimate(s) using the equation provided in Section 5 of this document.
- 5) Conduct quality assurance of the resulting MERP estimate(s) and evaluate the interpretation and appropriateness given the nature of PM_{2.5} precursor emissions sources and chemical formation in the area of interest. This evaluation will likely require emissions inventory data and observed ambient data for PM_{2.5} and precursors.



Illustrative MERP Values

Table 7.1 Most Conservative (Lowest) Illustrative MERP Values (tons per year) by Precursor, Pollutant and Region. Note: illustrative MERP values are derived based on EPA modeling (as described in section 4) and critical air quality thresholds (as described in Section 5).

Precursor	Area	8-hr 03	Daily PM	Annual PM
NOx	Central US	126	1,820	7,427
NOx	Eastern US	107	2,467	10,037
NOx	Western US	184	1,155	3,184
SO2	Central US		256	1,795
SO2	Eastern US		675	4,013
SO2	Western US		225	2,289
VOC	Central US	948		
VOC	Eastern US	814		
VOC	Western US	1,049		